

Management of Stand Growth and Yield

- Objectives

- Thinning practices to manage stand growth and yield

- **First:** questions, take-home points, things you learned, etc. from reading assignment

Management of Stand Growth and Yield

- Pruning

Self Pruning



Artificial Pruning



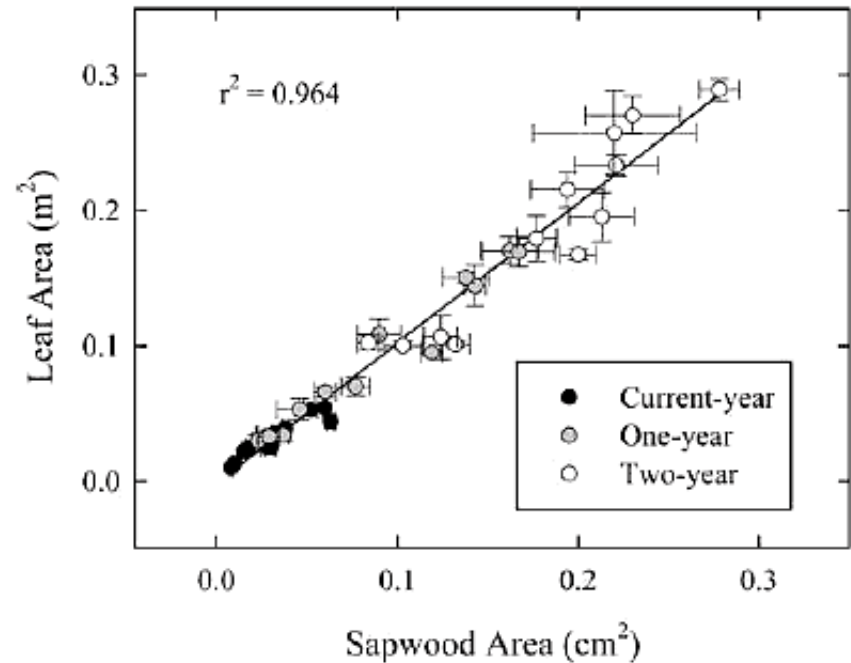
Management of Stand Growth and Yield

- Thinning



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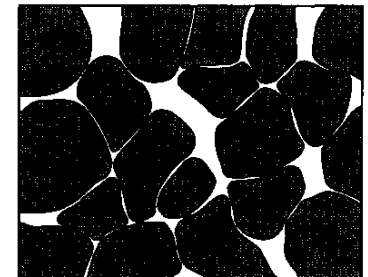
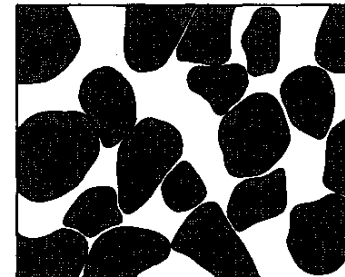
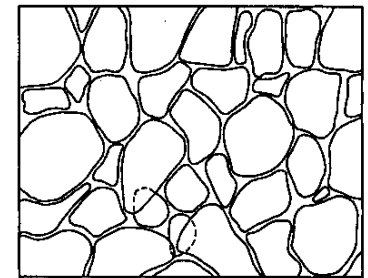
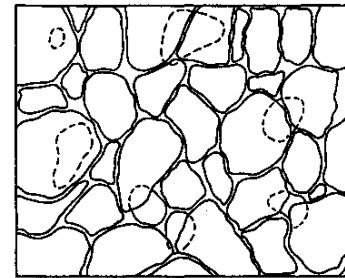
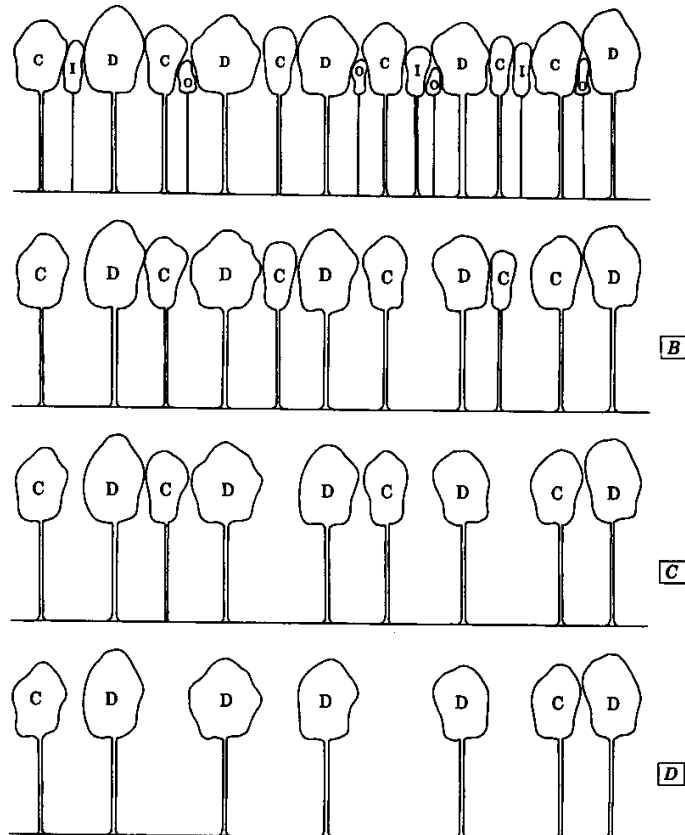
- Thinning

Thinning represents the primary means by which the yield of stands can be increased beyond the best that might be achieved under purely natural conditions.



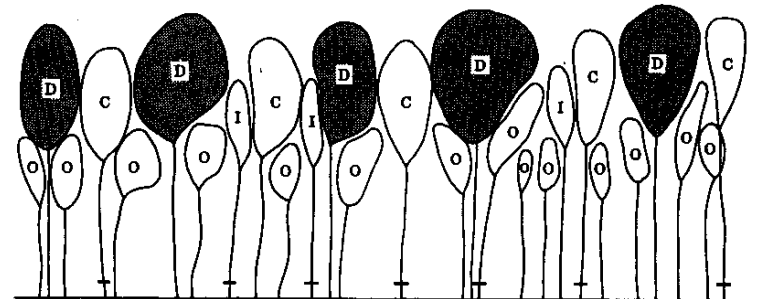
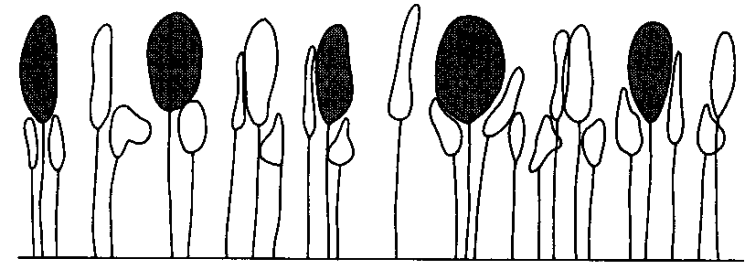
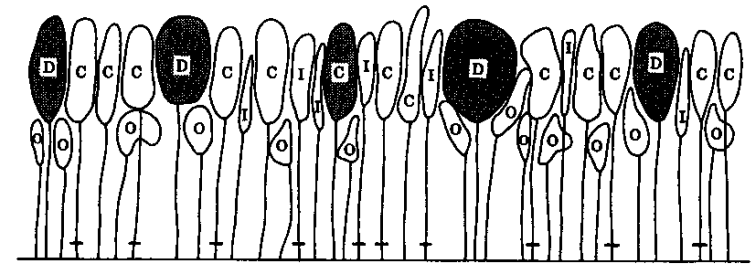
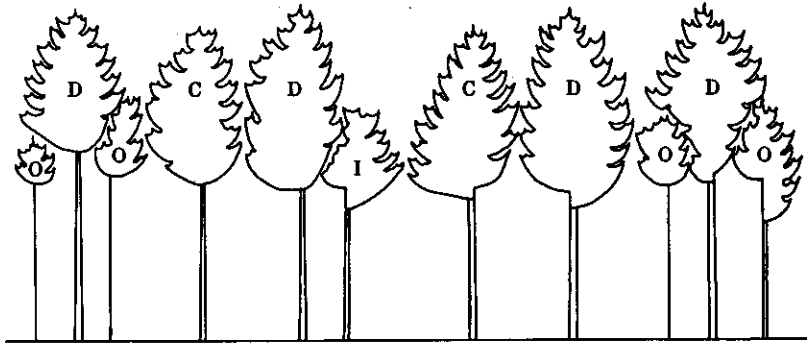
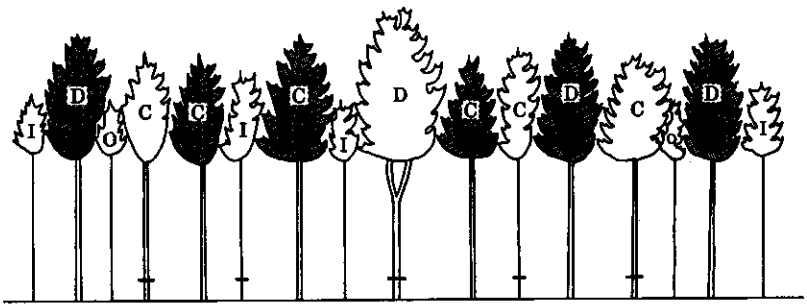
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- Low Thinning



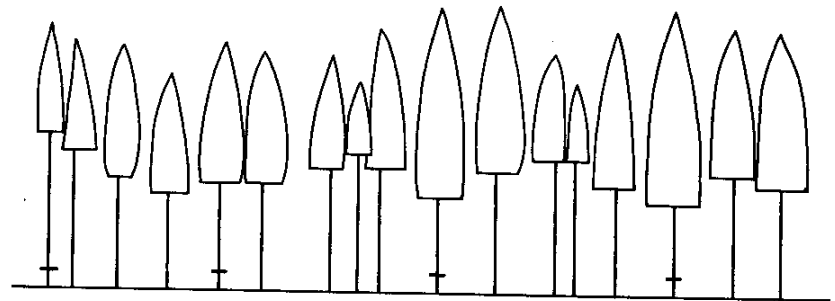
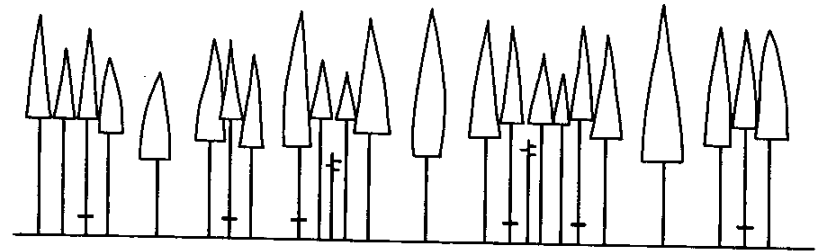
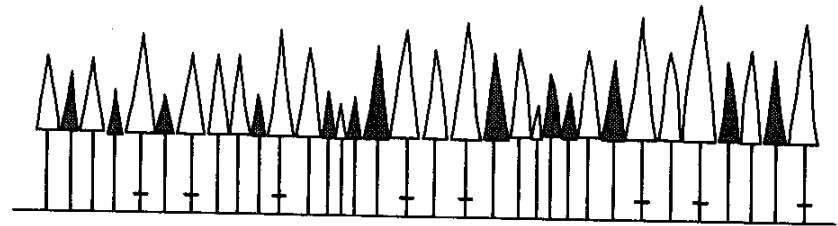
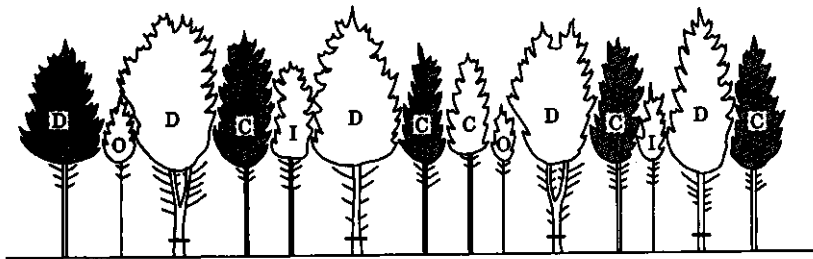
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- Crown Thinning



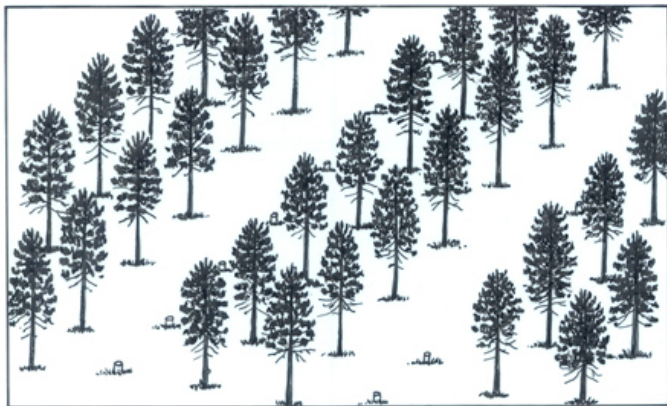
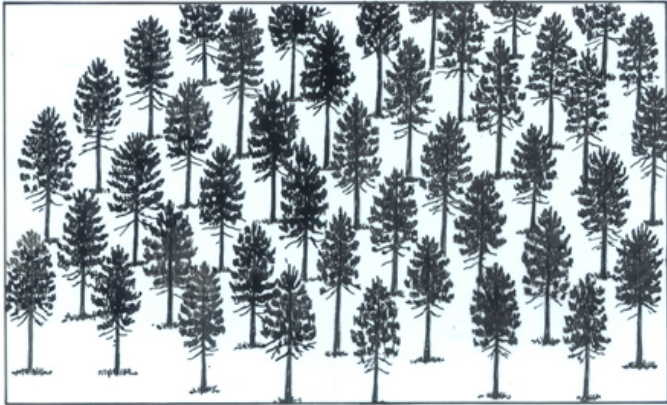
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- Selection Thinning



Management of Stand Growth and Yield

- Geometric/Mechanical Thinning



Management of Stand Growth and Yield

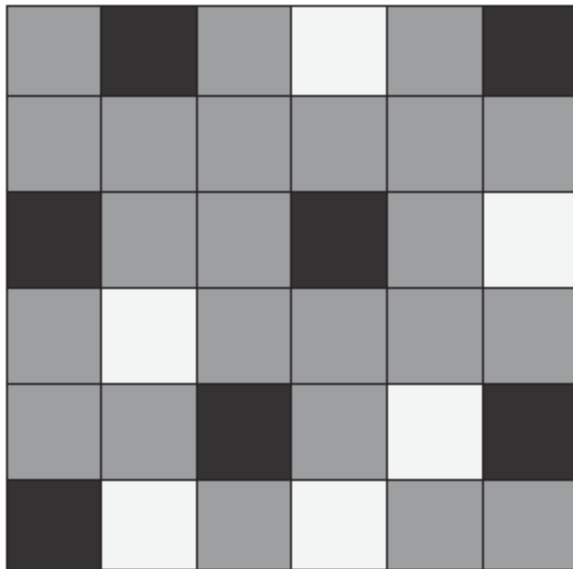
- Ecological Forestry

Table 4.—Contrasts between the outcomes of tree mortality processes and traditional thinning treatments

Process	Unmanaged stand		Treatment	Managed stand	
	Cause	Outcomes		Purpose	Outcomes
Competitive tree mortality	Resource competition	<ul style="list-style-type: none"> -Larger trees retained -Competitively superior trees favored regardless of species -Shift toward uniform tree size distribution, but variability occurs -Tree quality and form will vary 	Silvicultural thinning	<ul style="list-style-type: none"> -Free growing space for crop trees -Capture economically valuable wood before mortality 	<ul style="list-style-type: none"> -Larger trees favored -Commercial species favored -Strong shift toward uniform tree size distribution -Poor quality trees removed
Small-scale canopy disturbance	Exogenous agents (ice, wind, fire, insects, disease)	<ul style="list-style-type: none"> -Dominant individuals removed -Creation of canopy openings -Canopy closure from adjacent trees -Height recruitment of existing regeneration -Establishment of regeneration -Establishment or growth of shrub and herbaceous plants -Generation of snags or large wood on the ground 	Few silvicultural analogs implemented as an intermediate treatment, as opposed to a regeneration treatment		

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- Ecological Forestry



- 0.10 ha grid scale
- Vary thinning by 0.10 ha units
- 20% skips (black)
- 20% gaps (light gray)
- 60% thinned (gray)

Figure 28.—Grid approach for implementing variable density thinning.

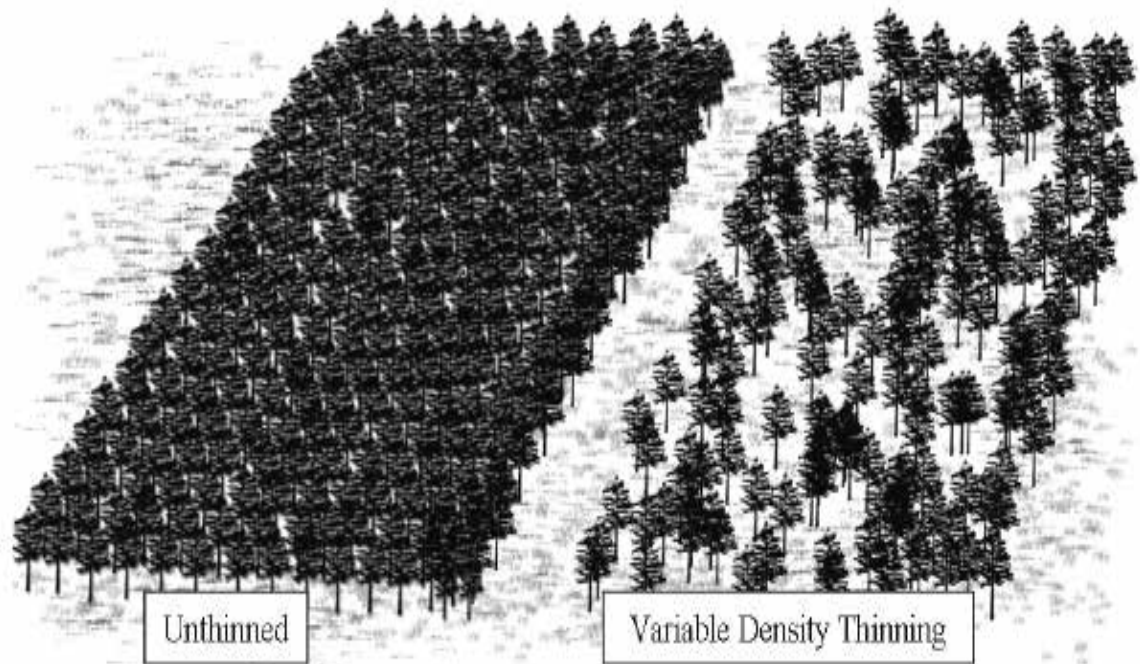
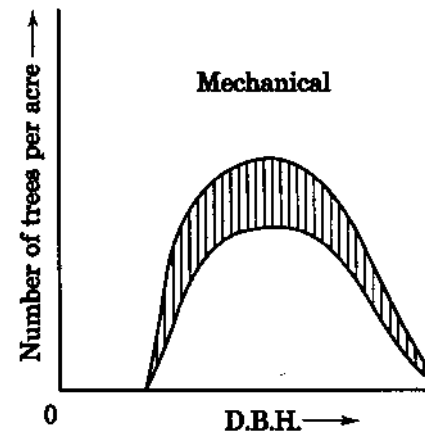
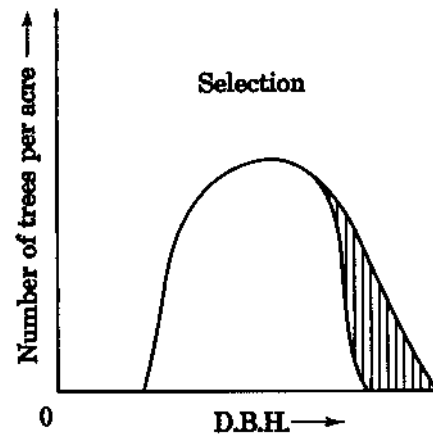
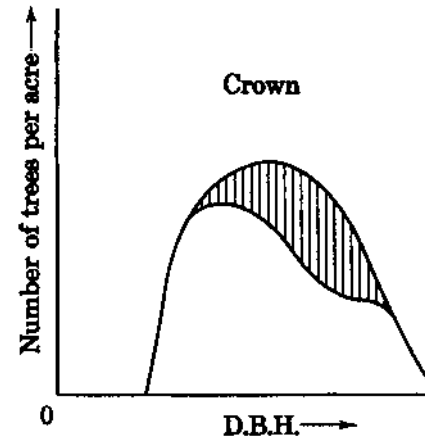
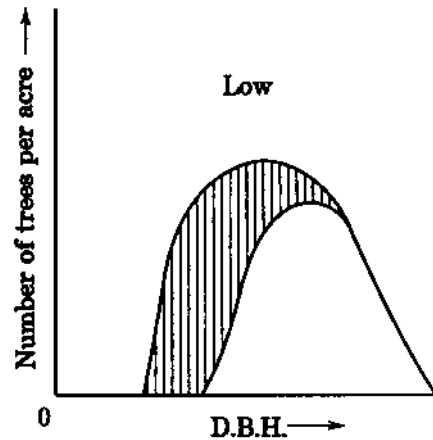


Figure 29.—Stylized representation of variable density thinning: (a) unthinned stand; (b) thinned stand displaying horizontal variation in stand density including gaps, skips (unthinned areas), and lightly thinned matrix.

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- Thinning



Management of Stand Growth and Yield

- Thinning

- The total cubic volume of wood that can be produced by a given stand in a given length of time may be reduced, but rarely increased by thinning

- Thinning concentrates resources, and subsequent yield, in fewer trees that are typically larger diameter (i.e., more valuable)

- Exceptions:

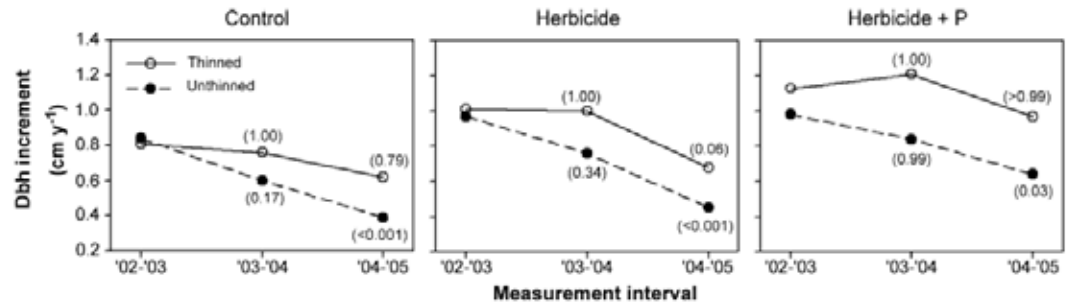
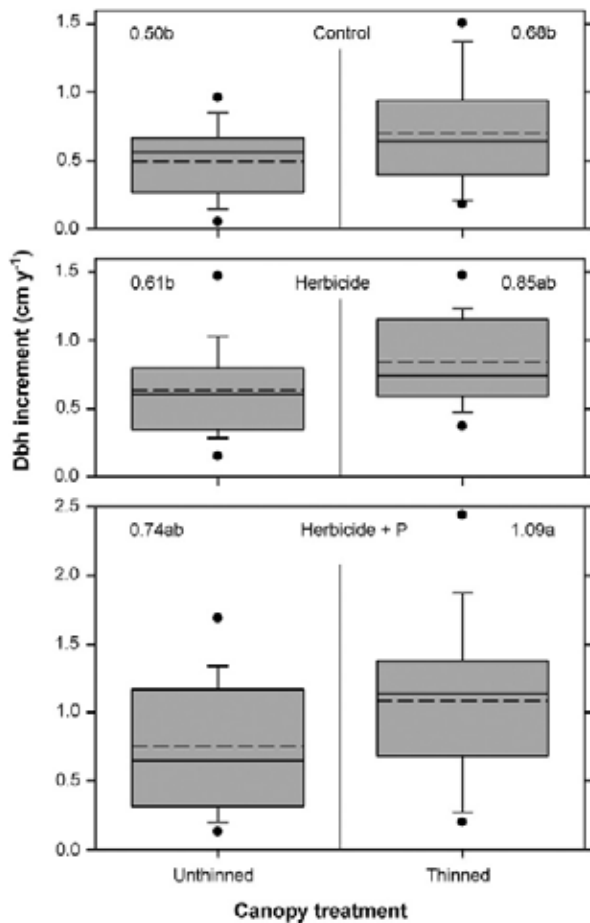
- » Selection thinning which maximizes the number of harvest trees (not large tree size)
- » Variable Density Thinning to promote stand heterogeneity

Management of Stand Growth and Yield

- Thinning - Does it work?
 - Scowcroft et al. (2007)
 - Crown thinning (crop tree) in 25-yr old secondary *Acacia koa* vs. Unthinned
 - Herbicide of understory grasses
 - Application of P fertilizer
 - Herbicide + P
 - Initial stand density of 955 trees ha⁻¹ → 655 trees ha⁻¹ following thinning
 - Stand initiated at 20,000 trees ha⁻¹

Management of Stand Growth and Yield

- Thinning - Does it work?



Management of Stand Growth and Yield

- Thinning - Does it work?

